Stroke Symptom Identification Tool for Hospitalized Patients in a Rural Setting

A Scholarly Project

Submitted to the

Faculty of Liberty University

In partial fulfillment of

The requirements for the degree

Of Doctor of Nursing Practice

By

Cheryl Henderson

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Lynchburg VA

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Scholarly Project Chair Approval:

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Vickie Moore, DNP, FNP-C   **Date**

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Abstract

Thousands of persons in the United States yearly suffer acute large vessel occlusion stroke (LVO). Caring for these individuals with strokes and the ensuing issues increases healthcare dollars. In underserved, rural communities, there is a dire need for improved methods to access care for these individuals. A 3-month evidence-based practice (EBP) project was conducted in a small rural town in Virginia with one of the state's highest rates of acute stroke. Nurses in the rural hospital voluntarily participated in an educational program on recognizing acute stroke and utilizing the Vision, Aphasia, Neglect (VAN) assessment tool. The participants (*N-15*) were asked to complete pre- and post-questionnaires on stroke and VAN knowledge. In addition, the nurses completed a Likert confidence scale and a subjective evaluation at the end of the 12 weeks. Nurses were given a badge card and a smartphone application to help remind them of the VAN assessment. Following the educational program, the participants had a 7.5% increase in knowledge. After the 3-month intervention, the overall knowledge retention was only 1.7%, thus a 5.8 percent decrease in knowledge retention. According to the Likert scale and subjective data, the nurse's comfort level with recognizing patients who could be suffering from an acute LVO stroke increased. The data confirms that educating the nursing staff is crucial in recognizing new acute stroke symptoms in their patient population. VAN assessment tools, badge cards, and smartphone applications are effective interventions that need frequent re-education and reinforcement of learning concepts to increase the recognition of acute LVO stroke symptoms in the patient population.

Keywords: Stroke symptoms, rural hospital, VAN assessment, nurse education

Dedication

First, I want to thank God for allowing me to choose my DNP path and providing inspiration and strength. With Jesus as my Lord and Savior, I have been led through many trials and struggles, and he has guided me through this journey.

I dedicate this doctoral work to my wonderful husband, Scott, who has encouraged me throughout my journey; he is my true love and has ignited the fire in me for education throughout our marriage. Also, our daughter Sarah, her love and support have been irreplaceable. To the nurses who participated in my scholarly project, I respect and truly appreciate you.

Thank You

Acknowledgments

I want to express my sincere appreciation to Dr. Vickie Moore, Scholarly project chair; her kind encouragement, help, and understanding have been instrumental in bringing this project to a successful conclusion. Her advice, knowledge, and support during this process has been an incredible blessing. I would also like to thank my board member and preceptor during my practicum program, Dr. Kimberly Warren. Her guidance and support have been crucial to my professional development and completing my doctoral program.

Stroke Symptom Identification Tool for Hospitalized Patients in a Rural Setting

Stroke is a leading cause of death for Americans. In 2020, one in six deaths from cardiovascular disease resulted from a cerebrovascular accident (CVA). Almost 800,000 persons in the United States suffer from CVA each year. Most strokes occur due to decreased blood flow to significant brain vessels. The cost of caring for individuals who have suffered from a CVA is in the billions and continues to grow (CDC, n.d.). The symptoms of this horrible ailment can be misleading and misinterpreted by clinicians and patients. Accurate, rapid examination of persons with stroke symptoms is critical to reduce disability and prevent the recurrence of a CVA (Yew & Cheng, 2015).

Many complicated issues contribute to the deficit in the swift diagnosis and treatment of CVA. In rural hospitals in the US, patients are less likely to receive crucial therapeutic procedures such as emergent mechanical removal of thrombus and experience higher mortality rates than in urban facilities (Loccoh et al., 2022). Along with the inadequacies in rural hospitals, inexperienced or novice nurses often care for patients who experience stroke symptoms that need to be identified quickly and accurately. Acute situations that occur suddenly need a quick and accurate response from the nursing staff (Sterner et al., 2018).

Currently, the US is in the depths of a health care crisis, with rural hospitals lacking resources and adequately trained nursing staff. What can be done to identify symptoms of an acute stroke in a patient in the hospital? How can nursing staff swiftly identify this emergency and assist in providing medical treatment as quickly as possible to patients with acute stroke symptoms? Education about CVA and its presenting symptoms should be included in nurse training, especially in these rural hospitals (Adelman et al., 2014). A tool for quickly identifying acute CVA symptoms can be introduced to help the nurses rapidly identify and activate code

stroke. The scholarly project aims to determine if a simple and quick identification tool can alert

the nurses if the patient has acute stroke symptoms in hospitalized patients in a rural hospital in

Virginia.

Background

Working in a rural hospital comes with a myriad of challenges. Minimal resources are

available to the patients and the medical professionals caring for these patients. Multiple

comorbidities often complicate the diagnosis and treatment of this population. In the US, older

adults presenting to rural hospitals with urgent conditions such as ischemic stroke are less likely

to receive crucial therapeutic procedures. These patients will experience higher mortality rates

than patients cared for in urban hospitals (Loccoh et al., 2022). The hospital utilized for this

project has a nursing crisis due to low nurse staffing, decreased retention, and a significant

number of inexperienced/novice nurses. Novice nurses are those categorized as unprepared to

work as fully qualified nurses. The medical community is concerned about the gap between

nursing education and practice in acute situations (Sterner et al., 2018). What if there was a way

to provide a simple exam for these novice nurses to utilize to improve their recognition of acute

stroke symptoms? Novice/inexperienced nurses' knowledge gap could be bridged to improve

their recognition of acute stroke and initiate treatment more swiftly. The Vision, Aphasia,

Neglect (VAN) assessment tool has been utilized by emergency medical services for years to

evaluate patients for acute stroke. It can be adjusted to meet the needs of the hospital

environment. Stroke outcomes and self-efficacy are associated with stroke knowledge, and a

simple tool that can help identify the stroke patient's needs can lead to increased learning and

efficiency (Adelman et al., 2014).

Utilization of the VAN tool can bridge the gap between the novice nurse's experience and the needs of the patient experiencing a stroke. The VAN tool has a reliable sensitivity and specificity for identifying patients with acute large vessel occlusion (LVO). The VAN tool has been considered more reliable in predicting a stroke's acute onset than the National Instituted of Health Stroke Scale assessment tool. The VAN assessment helps identify stroke symptoms arising from distinct anatomical regions that would indicate an LVO (Navalkele et al., 2020). When this kind of stroke, which would be considered an LVO, is identified, swift management can be initiated, and the patient can receive either the clot-busting procedure or probable thrombectomy procedure (Birnbaum et al., 2021).

Problem Statement

Research supports that patients in underserved rural hospitals suffer health inequities secondary to a lack of resources and lower-income populations (Loccoh et al., 2022). The incidence rate of stroke in hospitalized patients ranges between 2% and 17% of all strokes. Delays in recognizing and managing stroke in hospitalized patients lead to worse outcomes. Implementing a nurse-driven protocol that can quickly be followed and utilized by the nursing staff can empower the nurses to identify strokes in the most at-risk patients. When used correctly, the VAN assessment tool can lead the treatment team in making decisions that lead to thrombolytic therapy and mechanical thrombectomy (Droegemueller et al., 2020).

Purpose of the Project

This project aimed to implement the VAN assessment tool, which helps nurses to quickly identify patients with acute CVA symptoms and promptly activate the code stroke process, in a rural hospital in Virginia. This tool can effectively be taught to and implemented by nurses in a

rural hospital and can be used to successfully identify acute stroke symptoms (Birnbaum et al., 2021).

Clinical Question

In a rural hospital in Virginia, does implementing an educational module and a recognition tool for new onset acute stroke symptoms in hospitalized patients, when compared to current practice, increase knowledge, and therefore increase stroke screening awareness in nursing staff over 3 months?

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Section Two: Literature Review

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An essential component of this project was the literature review. The appraisal of evidence aimed to support the clinical question. Numerous articles discussed the disparities of acute stroke and its impact on population health. The VAN assessment for recognizing acute stroke symptoms was identified as a quick and efficient model for use in the hospital environment. This literature review evaluated the effectiveness of the VAN tool and how its use can lead to the swift identification of stroke symptoms, leading to stroke treatment. Quick stroke treatment aims to provide an avenue for intervention and treatment of CVA while decreasing the effects of a stroke that is not recognized quickly.

Search Strategy

A literature review was conducted to gather data about the crisis that health care is facing and the recognition of acute stroke in the hospital environment. Several goals were identified that led the journey through different pathways during the literature search. A wide-ranging database search was conducted using CINAHL, PubMed, EBSCOhost, ProQuest, and Medline. The following keywords and phrases were utilized during the investigation: *acute stroke, symptoms of stroke, stroke in hospitalized patients, VAN tool for identification of stroke, barriers to stroke*

identification, rural hospital disparities and acute stroke, novice nurses and knowledge of stroke, and *stroke awareness.* For the search, inclusion and exclusion criteria were established. The articles were limited to those written within the past 5 years, peer-reviewed studies were preferred, and clinical case studies and clinical trials were included. Twenty-eight articles were identified that fit the search criteria throughout the search. After inclusion criteria were applied, 17 articles remained as evidence for this project. Thoughtful attention was paid during the literature search to avoid ineffective data or research studies that were biased or involved a conflict of interest.

Critical Appraisal

While the research was conducted, each article was evaluated and examined for the level of evidence according to Melnyk's hierarchy (University of Michigan Library, 2021). This literature review includes many articles that were very valuable for this project. The review includes three randomized control studies, four descriptive designs, two observational cohort studies, four retrospective studies, two systematic reviews, and two expert opinion articles. The literature matrix that describes the quality of each article is included in Appendix A.

Synthesis and Critical Appraisal of the Literature

Controlled Trials

Droegemueller et al. (2020) conducted a randomized control study to improve the identification of and the quality of care for patients who suffer from strokes while in the hospital. A nurse-driven in-hospital stroke protocol was implemented, and a specialized stroke team initiated the process of caring for a stroke patient. At the study's conclusion, the intervention was found to have led to a marked increase in the stroke cases identified. In addition, the patients were also rapidly evaluated, leading to a rise in the frequency of acute stroke treatment.

In another study, Wang et al. (2018) aimed to determine if a multifaceted quality improvement intervention could improve hospital personnel's adherence to performance measures for patients with acute stroke. A total of 4,800 patients across 40 hospitals were involved in this study, which showed a slight improvement in the commitment to a performance measure. A slight improvement was considered valuable as it improved stroke patients' outcomes.

Teleb et al. (2016) evaluated the VAN screening tool with nurses in an emergency room. The nurses were instructed to utilize the tool to assess patients who presented with acute stroke symptoms quickly. The tool helped elevate the patient with acute stroke symptoms to the code stroke status, and then appropriate treatment was implemented. Although this study was only conducted in one emergency room, which limited the validity of the research and its results, there was valuable information gained from the study.

Descriptive Designs

Bliss and Aitken utilized a qualitative design was utilized to explore the experiences of registered nurses to ascertain whether their perceived simulation enhanced their skills in recognizing a deteriorating patient. In this descriptive study, data were collected via an interview with nurses after a professional development course. The study found that the nurses felt they had improved knowledge and skills, which improved their ability to identify a deteriorating patient. Adelman et al. (2014) also studied if increasing knowledge would enhance the nurse's ability to identify stroke victims. This study was conducted with emergency room nurses. Online modules on stroke education were added to the staff's annual education. The authors concluded that this additional education was necessary and needed to be included in future educational

requirements for nurses. The increased knowledge led to increased identification of symptoms

patients were experiencing and improved patient outcomes.

Additionally, a descriptive analysis helped discover the incidence of death in hospitalized

patients who developed new-onset atrial fibrillation. This study included all patients older than

50 admitted to the hospital in 2005 and 2011. During the analysis, atrial fibrillation was

associated with an increased incidence of stroke, leading to increased mortality (Massera et al.,

2017).

Sterner et al. (2018) conducted a qualitative study and gathered data by interviewing

novice nurses who discussed their perceptions of acute nursing situations. The novice nurses

confirmed that their care improves when they receive support from more experienced nurses. In

a critical situation, it is crucial to make quick decisions. Data support that greater involvement of

seasoned nurses with novice nurses leads to increased knowledge for novice nurses. As a result,

patient outcomes are improved.

Cohort Studies

Birnbaum et al. (2021) sought to validate the use and efficacy of the VAN tool and

determine if the screening could lead to the identification of an LVO. The study compared the

VAN tool to the National Institutes of Health (NIH) stroke scale and was completed by the

emergency medical staff. The medics were already trained on the NIH scale and participated in

VAN training. The VAN assessment performed better than the NIH scale when predicting LVO.

The VAN tool was viewed as a quicker evaluation. Still, the researchers stated that more

research needs to be completed to make a good decision when choosing a stroke evaluation tool.

Cadilhac et al. (2019) explored the difference in long-term outcomes between patients

with in-hospital stroke events who were treated in stroke units and those who were treated in

other hospital medical wards. The results revealed that patients who experienced an acute stroke and were cared for in the stroke unit had better outcomes overall.

Expert Opinions

Two articles were expert opinions. Choi et al. (2022) discussed the specifics of acute stroke diagnosis. The risk factors were discussed, including obesity, diabetes, hypertension, and dyslipidemia. Behavioral factors such as smoking, sedentary lifestyle, and unhealthy dietary choices contributed to risk factors leading to acute stroke. The emergent workup testing needed for the patient presenting with stroke symptoms was described, such as emergent blood sugar monitoring and CT of the brain. The different stroke types were explicitly explained in this article, which focused on LVO. An LVO is considered a potentially reversible ischemic infarct, and swift evaluation is crucial for the patient. This article provided very detailed information about the pathophysiology of acute stroke.

Another terrific source of information is an article by Yew and Cheng (2015). The article explains that the symptoms of stroke can be misleading and misinterpreted by clinicians and patients. Additionally, the rapid, accurate examination of persons with stroke symptoms can reduce disability and help prevent recurrences. This article also briefly covers the interpretation of diagnostic testing, with an emphasis on identifying the difference between a hemorrhagic and non-hemorrhagic stroke. The expert opinion stresses that patients and family members should be educated about stroke symptoms. The general population has a knowledge deficit and needs more information on identifying symptoms that would lead them to seek emergency medical care (Yew & Cheng, 2015).

Systematic Reviews

A systematic review assessed the clinical characteristics and therapeutic interventions implemented with an in-hospital stroke alert protocol. Four years of charts were reviewed on 1,965 stroke-alert patients at a university hospital. The researchers found that activation of the stroke alert system led to quicker evaluation, resulting in more interventions for acute stroke (Del Brutto et al., 2019). Van Gaal et al. (2017) reviewed six randomized controlled trials and found that the VAN tool is a helpful adjunct for clinical assessment in rural areas. Strokes that required intervention were identified using the VAN tool. Emergency medical units were more likely to divert to the appropriate facilities for thrombolytic treatment and thrombectomy. The VAN tool facilitated the identification of an acute LVO.

Retrospective Study

Loccoh et al. (2022) evaluated the differences in procedure care of stroke patients and patient mortality rural and urban hospitals. Evidence from the chart review showed that the 30-90-day mortality rate in the rural hospital was higher than that of the urban hospital. The issue brought to the forefront of this study was that the medical community is responsible for reducing inequities between rural and urban health centers by decreasing stroke mortality in rural communities (Loccoh et al., 2022).

A retrospective study validated the VAN assessment and compared it to other acute stroke screenings. The VAN assessment was implemented for use by emergency room nurses. The tool was considered an effective way to evaluate patients during an emergent cerebrovascular event (Ver Hage et al., 2018). Navalkele et al. (2020) found that the VAN screening tool has high sensitivity and is a very efficient tool for identifying LVO in the hospital setting. Not only does the VAN tool help to detect acute stroke, but it also quickly rules out the

patient who is VAN negative. When a patient is identified as VAN negative, a different disorder

can be considered. A goal of accurate identification of stroke patients is to avoid unnecessary

transfer to another facility and ultimately preserve precious resources (Navalkele et al., 2020).

Patel et al. (2021) compared the effectiveness of the NIH stroke scale to the VAN

assessment tool for identifying acute stroke in prehospital patients and the emergency

department. The VAN tool effectively identified acute stroke when the algorithm was followed

for both assessment scales. Although the VAN tool is helpful, false positives for LVO were

identified, which can cause increased use of medical resources and increased costs for the

medical system and the patient.

Conceptual Framework

The Iowa Model is a widely used framework for implementing EBP. The model is used

to help clinicians ask questions and use a systematic EBP approach to promote excellence in

health care (Iowa Model Collaborative, 2017). Used extensively in designing an organizational

practice change, the Iowa Model is a framework for research utilization in health care

(Zaccagnini & Pechacek, 2021). The University of Iowa has permitted the Iowa Model to be

used in this evidence-based educational Doctor of Nursing Practice (DNP) project (see Appendix

C).

The trigger for this project is the disparity of the incidence of stroke between rural and

urban hospitals. Older adults presenting to rural hospitals with urgent cerebrovascular incidents

are less likely to survive an acute stroke (Loccoh et al., 2022). Stroke outcome is directly related

to the nurses having appropriate stroke knowledge, and there is a crucial need for education and

training for nurses in rural hospitals (Adelman et al., 2014). Providing clinical education and

training to nurses is clinically relevant and can be addressed through EBP (Melnyk & Fineout-

Overholt, 2019). This project prepared nurses to understand better the stroke signs their patients exhibit and react to stroke emergencies more efficiently.

A team was assembled of the researcher, the rural hospital's chief nursing officer, and the project chair. The team worked together during the implementation of the project. Approval was obtained to conduct the project and educate the nursing staff at the rural hospital. A narrated PowerPoint educational program was presented to the nursing staff. Participation in the academic program and questionnaires was voluntary. The stakeholders were apprised of the project, and questions were answered as they arose (Melnyk & Fineout-Overholt, 2019).

The results were calculated using descriptive analysis via Microsoft Excel and shared with all stakeholders involved. All data collected was anonymous. A systematic approach is essential to determine the impact of EBP on outcomes. The results helped establish the longevity of this program at the rural hospital utilized for the project (Iowa Model Collaborative, 2017).

Summary

This project aimed to determine if the VAN assessment tool can help nurses identify patients with acute stroke symptoms swiftly. The goal is to provide a quick means for the nurses to activate code stroke when necessary. This tool can effectively be taught and implemented to nurses in a rural hospital and can be an effective tool for identification of acute stroke symptoms (Birnbaum et al., 2021). The literature highlights the importance of swift recognition of acute stroke symptoms to decrease mortality from strokes (Navalkele et al., 2020). In 2020, one in six deaths in the United States was related to CVAs. Stroke is a leading cause of death in the US, and the cost to health care and the patient are astronomical (CDC, n.d.). Literature supported the need for this scholarly project. An educational module and recognition tool for new onset acute stroke symptoms in hospitalized patients increased the nurses' knowledge and implementation of

stroke screening. The implementation of the VAN screening tool to assess LVO is associated

with a higher rate of identification of patients eligible for intervention and treatment for LVO

(Ver Hage et al., 2018). The addition of the VAN tool to the nurse's toolbox is supported by

literature and, when utilized, the tool can help nurses recognize the patient who can benefit from

a higher level of treatment and intervention for an LVO.

Section Three: Methodology

Design

This project involves the presentation of an educational program in a rural hospital

setting to evaluate the nurse's ability to recognize acute stroke symptoms. EBP is the foundation

of this project, and the Iowa Model is the foundation for the quasi-experimental, descriptive

design. A stroke recognition tool assisted the nurses in assessing LVO stroke symptoms. The

intervention included a pre-questionnaire, an educational program on symptoms of acute stroke,

a post-questionnaire, and 3 months of implementation, during which the nurses utilized the VAN

acute stroke assessment tool to assist them in recognizing acute stroke symptoms. A post-

educational questionnaire was used to evaluate if the nurses retained the knowledge from the

educational program. Also, a questionnaire after the program measured how the intervention

affected the nurse's feelings and emotions. An extensive literature search uncovered evidence

and professional opinions to support this project.

The use of the VAN tool to assess acute stroke symptoms has been associated with a

decrease in time that it takes for a patient to get to a higher level of care to undergo an

intervention for an LVO in the prehospital environment (Ver Hage et al., 2018). The tool

accurately identifies patients with an LVO and allows the clinical team to expedite care and

mobilize resources (Teleb et al., 2016). Acute situations, such as acute stroke, happen quickly.

The patient experiencing an acute condition needs a nurse who has the skills and knowledge to respond to an emergency (Sterner et al., 2018). The educational program's purpose was to provide the nurses with the necessary education and tools to improve their skills and recognize when their patients experience acute LVO symptoms.

Measurable Outcomes

1. After the educational program, the nurses will demonstrate an improvement in their knowledge of acute stroke symptoms and the VAN assessment tool, as evidenced by the data collected and compared from the pre-implementation questionnaire, demographics, and the post-education survey.

2. After the 3-month implementation period, the nurses will demonstrate retained knowledge of acute stroke symptoms as evidenced by a comparison of the scores of the post-education survey and the 3-month post-education survey.

3. After completion of the 3-month implementation, the nurses will demonstrate increased confidence in recognizing stroke symptoms and utilizing the VAN tool, as evidenced by an increase in their confidence on the post-implementation questionnaire.

One of the project's goals is for nurses to demonstrate increased knowledge of the acute symptoms of stroke and the VAN assessment tool after completing the educational program. A post-education questionnaire assessed the nurses' comprehension of the material. The nurses completed the knowledge questionnaire after completing the 3-month VAN assessment tool intervention. The second goal is for the nurses to demonstrate an increase in confidence in recognizing stroke symptoms and utilizing the VAN tool, as evidenced by an increased knowledge and self-efficacy questionnaire scores.

Setting

The scholarly project was conducted in a rural hospital in Virginia. The stroke mortality

in the city of Franklin, where the hospital is located, is the highest in the state (Virginia

Department of Health, n.d.). The nursing population at the hospital on all units is mostly

composed of novice nurses, as most nurses are certified as licensed practical nurses (LPN) and

associate-prepared registered nurses. Novice nurses have been described as unprepared for

working as fully qualified nurses (Sterner et al., 2018) and a gap has been noted between their

education and ability to manage acute situations. Stroke awareness, outcome expectations, and

self-efficacy are associated with stroke knowledge, and these topics should be included in the

education of nurses (Adelman et al., 2014).

Population

The population for this project is all nursing staff at a rural hospital in Virginia. The

nurses were from the emergency department, medical/surgical telemetry floor, and the intensive

care unit. There was no randomization of the participants, as all nurses at the hospital were

included in the educational program and survey. Participation was voluntary and anonymous.

Ethical Considerations

Nurses have the same duties to themselves as to others, including professional growth,

maintenance of competence, preservation of wholeness of character, and personal integrity. As

the DNP is responsible for attending to the patient's rights, they also have a responsibility to help

nurses achieve the knowledge needed to provide the best care to the patient. Nurses must

advance their profession through knowledge development, evaluation, dissemination, and

application to practice, and the DNP must interact with research and relate it to practice. All

human participants must be respected and protected from potential harm (Fowler, 2015). Every

effort was made to protect and respect the participants in this project. The participants were always appreciated, and their privacy was protected. No names were necessary on the questionnaires.

The project leader completed education in biomedical and health science research and social and behavioral science research. Collaborative Institutional Training Initiative certification was completed, and the certificate can be found in Appendix B. The Liberty University Institutional Review Board approved this scholarly project for study and as a non-human subject EBP project.

Tools and Data Collection

Data were collected from the pre- and post-surveys and the survey administered after the 3-month implementation period. The questionnaires contained a combination of yes or no questions and Likert-scale questions. The paper questionnaire was handed to the nurses, who were given instructions. The questionnaires were placed in an envelope with instructions about when to take the questionnaires and how to return them to the researcher.

Intervention

A PowerPoint educational program was provided to the nursing staff at a rural hospital. The program briefly summarized a large LVO stroke and explained that the VAN assessment tool is an effective screening tool for identifying LVO. The device can accurately identify the patient suffering from an obstruction to a large vessel in their brain and can help the patient get to an intervention swiftly (Teleb et al., 2016). Medical professionals effectively teach and implement the VAN tool (Birnbaum et al., 2021). Emergency medical professionals characteristically utilize this tool, although it has also been used in the hospital environment (Ver Hage et al., 2018).

A combination of PowerPoint slides and videos about the VAN screening assessment was presented as part of the educational experience. The first part of the VAN assessment requires the patient to hold both arms up for 10 seconds. If they do not drift, they are VAN negative and do not need to go on with the exam. If they do have drift, the exam assesses the visual field by asking if the patient has double or no vision. Aphasia is the next part of the exam. The nurse assesses if the patient can speak and names two everyday items. Next, the nurse assesses neglect by determining if there is there a forced gaze to the left or right and if the patient can identify if the examiner is touching the left or right arm. If the patient is positive for arm drift and one of the other assessments, they are VAN positive and must be worked up for an LVO. The nurses were provided a badge card and were offered a link to a free application for their smartphones to assist them with their exams.

Timeline

The project has been in the planning and implementation stage for approximately 1 year:

- August 17, 2022: Planning phase began, clinical question was developed, and research was initiated.

- November 14, 2022: First defense.

- January 18, 2023: Project materials distributed to participants with instructions.

- January 25, 2023: Implementation of project began and continued for 12 weeks.

- April 17, 2023: The implementation of the scholarly project was completed.

- May 1–May 29, 2023: Data computed and sent to project chair for editing.

- May 31, 2023: Scholarly project sent to editor.

- June 27, 2023, at 2:00 p.m.: Final defense.

- To be determined: Project submitted to Scholars Crossing.

Data Analysis

Questionnaires were collected, and the results were calculated using a descriptive

statistical method. A Microsoft Excel spreadsheet was utilized to analyze the results.

Demographic questions only included approximate age, licensure level, and gender.

Demographics

A greater number of the participants were registered nurses (RN) as opposed to LPNs.

Most of the nurses had more than 4 years of nursing experience (see Figures 1 and 2).

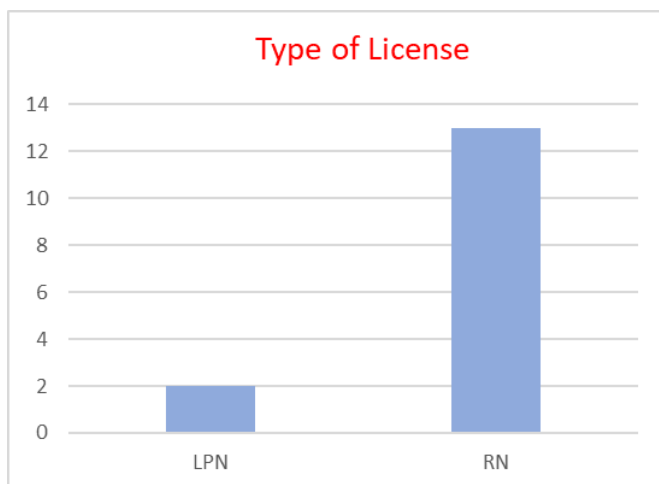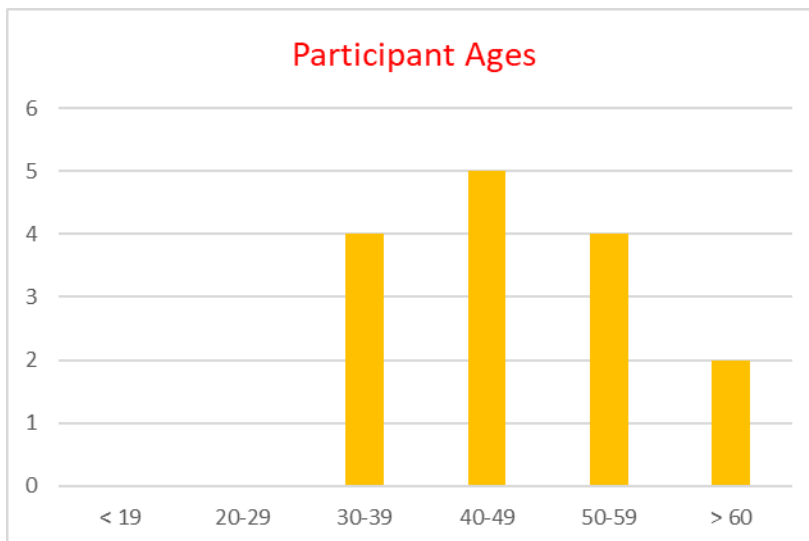**Figure 1**

Participants' Licensure

Figure 2
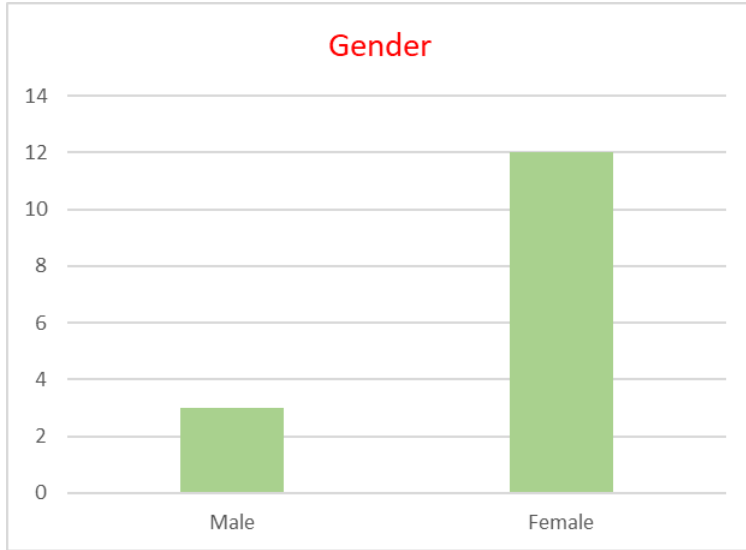
Participants' Years of Nursing Experiences

All the nurses who participated were over 30 years of age. The ages ranged from 30 to over 60. More nurses were female than male (see Figures 3 and 4).

Figure 3

Participants' Ages

Figure 4

Participants' Gender

Gender

Measurable Outcome 1

After the educational program, the nurses demonstrated an improvement in their

knowledge of acute stroke symptoms and the VAN assessment tool, as evidenced by the

questionnaire scores. An analysis and comparison of the scores from the pre-test and post-test

revealed the nurse participants had an increase in knowledge of 7.5% (see Figure 5).

**Figure 5**

Pre- and Post-Test Results
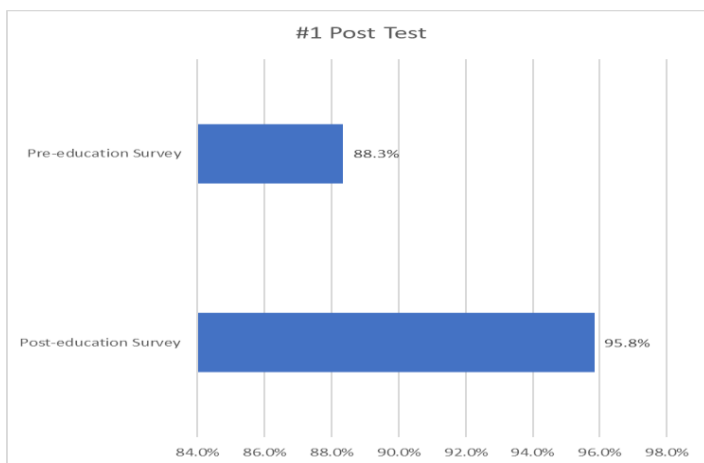
Measurable Outcome 2

After the 3-month implementation period, the nurses demonstrated retained knowledge of acute stroke symptoms, as evidenced by a comparison of the scores of the post-education survey and the 3-month post-education survey. After the 12-week implementation period, the nurses were given the post-implementation test to determine their retained knowledge level. The scores from the post-implementation test were first compared to the scores from the educational pre-test and then to the post-test. The average score on the pre-education test was 88%. After the implementation, the average score on the test was 90%, an increase in overall retained knowledge of 1.7% from baseline. The scores did decrease 5.8% (from 95.8% to 90.0%) from the educational post-test to the post-implementation test (see Figure 6).

Figure 6

*Post-Education and Post-Implementation Results*
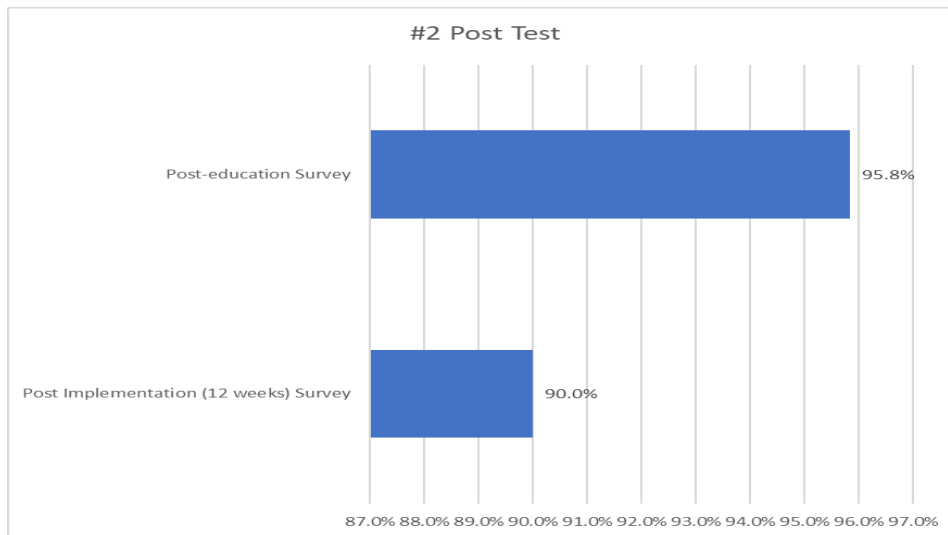
Measurable Outcome 3

The nurses' confidence was tested not only on a Likert scale at the beginning of the project but also with subjective questions after the 12-week implementation of the program. The results of the Likert scale and subjective questions were compared. After completing the 3-month

implementation, the nurses demonstrated increased confidence in recognizing stroke symptoms and utilizing the VAN tool, as evidenced by an increase in their confidence on the post-implementation questionnaire. The nurses' confidence was screened using a Likert scale at the beginning of the project. After the 3-month implementation, the participants were given a questionnaire with subjective questions. Initially, the nurses' average Likert scales reflected a need for education on the VAN assessment tool. Following the implementation, the nurses' level of confidence in their ability to recognize acute stroke symptoms and when to activate code stroke had increased (see Figure 7).

Figure 7

Participants' Confidence
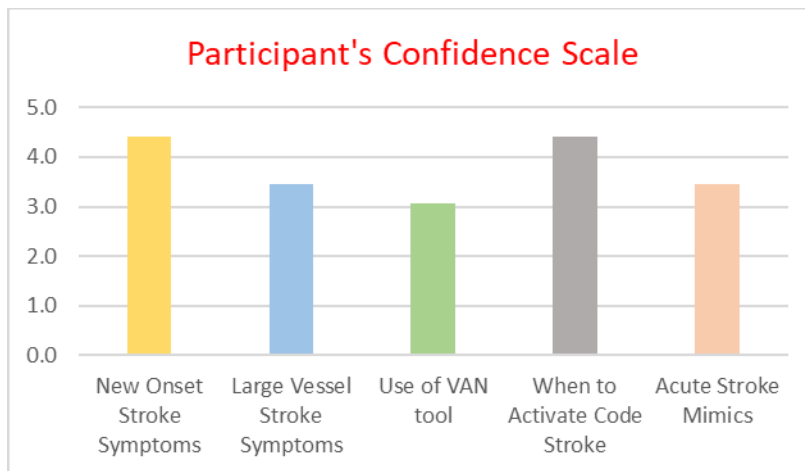
Section Four: Results

The participants in this evidence-based DNP project were the nurses working in all departments in the rural hospital in Franklin, Virginia. Nurses were asked if they would like to participate in an educational program, and when they agreed, they were given an envelope. On the front of the envelope were detailed instructions. Inside the envelope were three separate envelopes containing pre- and post-education surveys, a flash drive, and a badge card. Included in the pre-education envelope was the demographics questionnaires. Detailed instructions were

printed on the front of the envelope indicating which envelope to open and the sequence of the

educational program. All envelopes were numbered.

Twenty-five surveys were distributed to the nurses who volunteered to participate.

Instructions were included on how to return the completed surveys confidentially. Participants

were given 1 week to complete the education and pre- and post-education surveys. Fifteen nurses

completed the education and returned the completed surveys to the appointed depository. The

nurses kept the flash drive and badge card and were allowed to utilize an application on their

smartphone if desired.

Demographics

The ages of the participants ranged from 30 years of age to greater than sixty 60 years

old. The average age was 45 years. A greater number of the participants were of the female

gender, with 12 being female and three being male. The nurses were also asked to indicate the

type of nursing licensure they held. Of the nurses who participated, 13 were RNs, and two were

LPNs. The experience level of the nurses who participated in the program was also indicated on

the demographic survey. Most of the participants had more than 5 years of experience, as 11

nurses were not of the novice designation. Four nurses who completed the program had only 1 to

5 years of nursing experience.

Descriptive Statistics

The nurses who participated in the program were more experienced than expected. It is

assumed that many of the less experienced nurses who work at the hospital chose not to

participate. Of the participants, 73.3% had more than five years of nursing practice, and 26.7%

had 1 to 5 years of experience. Additionally, 86.7% of the participants were RNs, and 13.3%

were LPNs. Eighty percent of the nurses who participated were female; only 20% male. The

gender demographics are consistent with the United States Census data

(https://www.census.gov/), which show that in 2023, approximately 15% of working nurses were

male. The nurses' mean age was 45 years.

Measurable Outcome 1

Before and after the educational presentation, the nurses were tested on their basic

knowledge of LVO and the VAN exam for patients suspected to be experiencing stroke

symptoms. The nurses demonstrated an increase of 7.5% in their comprehension scores after the

educational video from the knowledge questionnaire taken before the education was provided.

During the project's implementation, the nurses could utilize their badge card and smartphone

application and review the flash drive as needed.

Measurable Outcome 2

The primary goal of this project was to develop an educational program, present it to

nurses, and increase their knowledge about the VAN assessment tool and ability to recognize an

acute LVO stroke. The nurses who participated (*N = 15)* completed and returned the same

knowledge questionnaire at the end of the 12-week implementation period. The test scores

reflected knowledge scores 1.7% above the pre-test scores. Unfortunately, there was a loss in

knowledge over time, as the score decreased by 5.8% immediately after the educational

intervention.

The project's overall goal after 12 weeks of implementation was accomplished. The

nurses participated in an educational program on recognizing symptoms of acute LVO stroke,

and their knowledge increased (see Figure 8).

Figure 8

Comprehension Before and After Education and After 12 Weeks

Comprehension After Education and Retention after 12 weeks
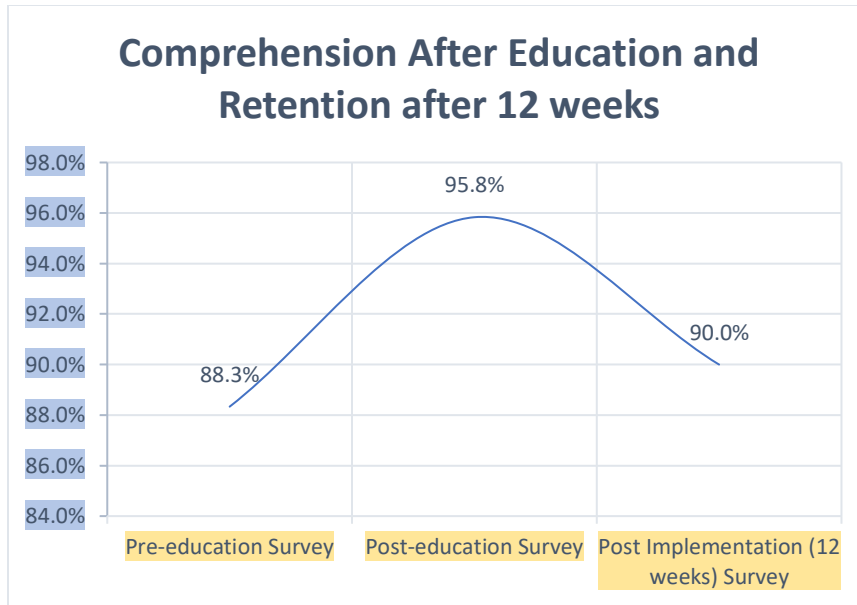
Measurable Outcome 3

A Likert scale was used to measure the participants' opinion of their knowledge and understanding of the symptoms of acute LVO stroke. The survey included questions about the nurses' confidence level when faced with new onset stroke symptoms. Other questions posed on the survey asked if they felt confident about when to activate the code stroke system and if they could identify the acute stroke mimics. Given the nurses who participated in the survey were more experienced in nursing, with 73.3% having greater than five years of experience, their confidence level averaged 75.6% (see Figure 5). It would be assumed that nurses with more experience would have higher confidence in their knowledge and skills.

After the program, the nurses who participated were given a subjective narrative questionnaire to complete. All the nurses answered this questionnaire. They were asked if they understood the signs and symptoms of new-onset stroke. The consensus was that the education was helpful, and the VAN tool is easy to follow and allows for the swift recognition of stroke symptoms. One nurse said the tool is "easy to use and understand."

Nursing Narrative Questionnaire

An additional question was added to discern if the nurses could use the tool on any patient experiencing stroke symptoms. Several nurses reported using the VAN tool to evaluate their patients. The tool was used as part of the nursing assessment to rule out strokes. One nurse used it in the emergency room and said they found it helpful during an evaluation. Nurse-driven stroke assessment focused on staff education and empowerment impacts stroke detection and outcomes (Droegemueller et al., 2020). Another nurse that worked in the emergency room used the VAN assessment on two patients over the 12 weeks of the implementation of the project and noted that the patients did get diagnosed with LVO strokes. It was pointed out that the tool was beneficial in helping the nurse to recognize the emergency. Several nurses said they had not had the opportunity to use the tool, although they did feel prepared after the education and using the VAN tool.

The nurses were asked if they felt confident in their skill level with the VAN tool, and the response was very positive. One nurse said, "I have been thoroughly educated on identifying stroke signs and symptoms." Some comments were that the VAN assessment is easy to use to assess the patient with stroke symptoms. The nurses made only positive comments on this narrative question and stated they preferred the ease of use of the VAN tool to the NIH stroke scale. Overall, the comments from the nursing staff were positive and reinforced the importance of an educational program to recognize acute stroke symptoms. The VAN tool is a quick and accurate tool for identifying LVO.

Section Five: Discussion

Implications for Practice

The health care system is rapidly evolving, and a patient's health status in the hospital can swiftly deteriorate. Recognizing and responding to a patient's deterioration is critical to ensure prompt, efficient management of the potentially critically ill patient. Nursing education has been noted to enhance nursing skills and knowledge (Bliss & Aitken, 2018). Acute stroke, including LVO stroke, is a grave health crisis and a leading cause of death for Americans (CDC, n.d.). These facts confirm that educational programs for practicing nurses on a continuum are a necessity. This EBP project demonstrated that an academic program could increase knowledge, although, over time, a significant amount of that knowledge may not be retained.

Sustainability

Educational programs exist for hospital nurses, although specific education on stroke symptoms and recognizing an acute stroke may be missing. Nurses are expected to respond to critical situations and must be prepared (Sterner et al., 2018). Stroke outcomes and nursing self-efficacy are associated with knowledge and recognition, which must be included in nursing education about stroke (Adelman et al., 2014). The VAN tool for recognizing acute stroke and LVO is easy to use and can be taught to nursing staff easily. This EBP project revealed that nurses comprehended the VAN assessment after only a short instructional video. And after the 12 weeks of evaluation, the nurses retained knowledge of the assessment. Importantly, according to the post-implementation questionnaire, the nursing staff did utilize the VAN exam to recognize patients with LVO stroke. The evidence supports the VAN assessment for identification of an acute LVO stroke and utilization in the emergency room and inpatient environment.

Dissemination Plan

Evidence demonstrated by this scholarly EBP project overwhelmingly supports the use of the VAN assessment tool for recognizing acute LVO stroke. The exam is an easy, swift tool that was shown to be easy to learn and bring into practice. The educational material is readily available online, and many resources are available to help educate the staff at no cost to the hospital.

The results and data from this scholarly project will be shared with all stakeholders. The resources used, to include online data and Dr. Taleb's online video, have been shared with the stakeholders. The project leader will be available for poster presentations at conferences such as the American Academy of Nurse Practitioners. The scholarly project will also be submitted to Scholars Crossing, Liberty University's institutional repository for all theses and dissertations.

Conclusion

It has been noted throughout this project that stroke is a significant health problem in the United States. Education of the nursing staff is the first step in the battle to increase the recognition of acute stroke in hospitalized patients. An educational program for nurses helps reinforce their ability to recognize patients who could be experiencing LVO. Further, a quick exam such as the VAN assessment tool is instrumental in assisting the nurses in examining their patients and alerting them of medical emergencies. The VAN tool can provide a swift exam for the nurses, help activate the acute stroke code when needed, and facilitate the patient's treatment and transfer.

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Appendix A

Evidence Table

Article Title, Author, etc.	Study Purpose	Sample	Methods	Study Results	Level of Evidence	Study Limitations	Would Use as Evidence to Support a Change?
Adelman, E. E., Meurer, W. J., Nance, D. K., Kocan, M. J., Maddox, K. E., Morgenstern, L. B., & Skolarus, L. E. (2014). Stroke awareness among inpatient nursing staff at an academic medical center. *Stroke, 45*(1), 271–273. https://doi.org/10.1161/STROKEAHA.113.002905	To evaluate stroke knowledge and predictors of stroke knowledge among inpatient and emergency department nursing staff.	All emergency and inpatient nursing staff at an academic medical center that was conducted at the same time yearly mandatory education was completed.	Online survey and education module: A non-experimental descriptive survey	Stroke outcome expectations and self-efficacy are associated with stroke knowledge and should be included in nursing education about stroke.	Level 6: Single descriptive design	Conducted in only one setting, small sample size	Yes: The study does provide some good foundational information and could be used as the basis of other research and change.
Birnbaum, L., Wampler, D., Shadman, A., de Leonni Stanonik, M., Patterson, M., Kidd, E., Tovar, J., Garza, A., Blanchard, B., Slesnick, L., & Blanchette, A. (2021). Paramedic utilization of Vision, Aphasia, Neglect (VAN) stroke severity scale in the prehospital setting predicts emergent large vessel occlusion stroke.	To validate the use and efficacy of the vision, aphasia, and neglect (VAN) tool for identifying large vessel occlusion (LVO) in the brain.	Prehospital setting emergency medical personnel	A comparison of the VAN scale and the National Institutes of Health scale to predict LVO	Both VAN and National Institutes of Health can predict LVO, and the VAN assessment tool had better sensitivity in predicting LVO	Level 4: Cohort study	There were stroke alerts that did not have a stroke scale documented, limiting the study.	Yes: The study provided evidence that the VAN tool provided a quick and efficient way to identify LVO.

Article Title, Author, etc.	Study Purpose	Sample	Methods	Study Results	Level of Evidence	Study Limitations	Would Use as Evidence to Support a Change?
Journal of NeuroInterventional Surgery, 13(6), 505–508. https://doi.org/10.1136/neurintsurg-2020-016054							
Bliss, M., & Aitken, L. M., (2018). Does simulation enhance nurses' ability to assess deteriorating patients*? Nurse Education in Practice*, 28, 20–26. https://doi.org/10.1016/j.nepr.2017.09.009	To explore the experiences of nurses and to determine whether they perceived that simulation can enhance their skills in recognizing the deteriorating patient.	Registered nurses were interviewed using a semi-structured interview.	An interview of nurses following a professional development course with scenario-based simulation for patient assessment.	Four themes were identified, knowledge, improved assessment skill in caring for the acutely ill patient, the learning environment and decision making. The use of simulation as a strategy was perceived by nurses to improve their own ability in identifying deteriorating patients.	Level 6: Single descriptive design, an exploratory qualitative design with interview.	The sample group was very small, only eight registered nurses were interviewed for the study	No: The evidence is compelling although a larger study group is needed to make any new policies or change.
Cadilhac, D. A., Kilkenny, M. F., Lannin, N. A., Dewey, H. M., Levi, C. R., Hill, K.,	To explore difference in long-term outcomes among	Forty-five hospitals participated for	The survival of patients 180 days after hospitalization	Patients with in-hospital stroke who were treated in	Level 5: Observational cohort	There was no intervention, it was only	Yes: The evidence did show strong evidence

Article Title, Author, etc.	Study Purpose	Sample	Methods	Study Results	Level of Evidence	Study Limitations	Would Use as Evidence to Support a Change?
Grabsch, B., Grimley, R., Blacker, D., Thrift, A. G., Middleton, S., Anderson, C. S., & Donnan, G. A. (2019). Outcomes for patients with in-hospital stroke: A multicenter study from the Australian Stroke Clinical Registry (AuSCR). *Journal of Stroke and Cerebrovascular Diseases, 28*(5), 1302–1310. https://doi.org/10.1016/j.jstrokecerebrovasdis.2019.01.026	patients with in-hospital stroke events and treated in stroke units compared to those managed in other hospital wards.	a time span of 4 years.	who were treated while having a acute stroke in the hospital in a stroke unit as compared to being treated in a regular ward.	stroke units died less often within 30 days than those not admitted to stroke units.	qualitative study.	an evaluation of the outcome of care that was provided in a regular unit versus a stroke unit.	that care of the patient having a stroke in the hospital would benefit from being cared for in the stroke unit.
Choi, E. Y., Nieves, G. A., & Jones, D. E. (2022). Acute stroke diagnosis. *American Family Physician, 105*(6), 616–624.	To describe the signs and symptoms of an acute stroke.	Purpose is to provide information and professional information.	Statistics and medical information is provided.	No study to provide results	Level 7: Expert opinion	There was no study only professional information and statistics provided.	No: Change could be supported with this article although the information was very thorough and provided essential information that could

Article Title, Author, etc.	Study Purpose	Sample	Methods	Study Results	Level of Evidence	Study Limitations	Would Use as Evidence to Support a Change?
							be used for policy change.
Del Brutto, V. J., Ardelt, A., Loggini, A., Bulwa, Z., El-Ammar, F., Martinez, R. C., Brorson, J., & Goldenberg, F. (2019). Clinical characteristics and emergent therapeutic interventions in patients evaluated through the in-hospital stroke alert protocol. *Journal of Stroke and Cerebrovascular Diseases, 28*(5), 1362–1370. https://doi.org/10.1016/j.jstrokecerebrovasdis.2019.02.001	To assess the clinical characteristics and therapeutic interventions implemented in patient evaluated through the in-hospital stroke alert protocol	A total of 1,965 stroke patient records were reviewed, 4 years' worth of stroke alert cases at a university hospital.	Systematic review: retrospective analysis of record of stroke alert patients in a university hospital	Stroke alert activation for the inpatient population did not increase the use of IV-tPA administration although did increase the rate of endovascular intervention.	Level 5: systematic review of descriptive and qualitative studies	The limitations included that is was a retrospective study and restricted by the accuracy of chart documentation. Also, the study was conducted at only one hospital and the results cannot be generalized for other healthcare settings.	Yes: The data collected can be used for further investigation and can be used to initiate further research and investment in stroke teams.
Droegemueller, C. J., Kashyap, B., Huna Wagner, R. L., Shibeshi, H., Clayton, M. W., Fennig, M. W., & Hussein, H. M. (2020). A successful quality improvement project for	To improve the identification of and the quality of care for patients who suffer from strokes while hospitalized	Patients having stroke symptoms while hospitalized and the nurses at the facility	Quality improvement project that involved the inpatient nurses and a nurse-driven program was	During the 2 years the quality improvement program was enacted there was more than a tenfold	Level 2: Randomized control study	Study was only conducted in on hospital. The results would be more widely accepted if	Yes: The data was significant and could be used at additional hospitals to support

Article Title, Author, etc.	Study Purpose	Sample	Methods	Study Results	Level of Evidence	Study Limitations	Would Use as Evidence to Support a Change?
detection and management of acute stroke in hospitalized patients. *The Journal of Neuroscience Nursing, 52*(4), 186–191. https://doi.org/10.1097/JNN.0000000000000517			developed for the nurses to activate the in-hospital code stroke. A total of 217 patients were involved in the program for evaluation.	increase in the recognition and treatment of stroke symptoms.		there were more hospitals involved in the quality improvement project.	change and improvement of stroke recognition.
Loccoh, Joynt Maddox, K. E., Wang, Y., Kazi, D. S., Yeh, R. W., & Wadhera, R. K. (2022). Rural-Urban Disparities in Outcomes of Myocardial Infarction, Heart Failure, and Stroke in the United States. *Journal of the American College of Cardiology.*, 79(3), 267–279. https://doi.org/10.1016/j.jacc.2021.10.045	To evaluate the rural-urban differences in procedural care and mortality for ischemic stroke.	Medicare recipients age >65 years of age with acute medical conditions.	To examine the association between presenting to a rural vs. urban hospital and stroke symptoms and compare the 30- and 90-day mortality.	The 30-day mortality rates were higher in rural hospitals for acute stroke.	Level 4: Retrospective cross-sectional study	There was no actual intervention, only record review.	Yes: this study provides the basis that could be used for the justification for a more extensive study.
Massera, D., Wang, D., Vorchheimer, D. A., Negassa, A., & Garcia, M. J. (2017). Increased risk of stroke and mortality following new-onset atrial	An investigation of the incidence of death in a hospitalized patient who developed new	All patients greater than or equal to 50 years of age admitted to a hospital from 2005 to 2011	A descriptive analysis was conducted of hospital records.	New onset atrial fibrillation among hospitalized patients was found to be	Level 5: Descriptive analysis	The study was only a record review there was no intervention.	No: The study provided valuable information; this does not show it

Article Title, Author, etc.	Study Purpose	Sample	Methods	Study Results	Level of Evidence	Study Limitations	Would Use as Evidence to Support a Change?
fibrillation during hospitalization. *Europace*, *19*(6), 929–936. https://doi.org/10.1093/europace/euw110	onset atrial fibrillation.	for a total of 84,919 patients.		associated with an increased incidence of stroke and mortality.			could support change.
Navalkele, D., Vahidy, F., Kendrick, S., Traylor, A., Haydel, M., Drury, S., & Martin-Schild, S. (2020). Vision, aphasia, neglect assessment for large vessel occlusion stroke. *Journal of Stroke and Cerebrovascular Diseases, 29*(1), Article 104478. https://doi.org/10.1016/j.jstrokecerebrovasdis.2019.104478	To validate and compare the VAN assessment to the NIHAA for LVO screening.	All patients who were admitted from 7/2008 to 12/2016 at a hospital with stroke symptoms.	A retrospective cohort study	The VAN assessment tool had the highest predictive score when compared to other screening tools.	Level 5: Retrospective study	Only one facility was used to compile the data for the study.	Yes: Even though only one facility was used to gather the data, it could be used as the foundation for other studies.
Patel, M. D., Thompson, J., Cabañas, J. G., Williams, J. G., Lewis, E., Bachman, M., Al Masry, M., LaVigne, C., Morantes, L., Becske, T., Kass-Hout, O. (2021). Performance of the vision, aphasia, neglect (VAN) assessment within a	To assess the validity and predictive value of the VAN assessment when used by EMS and the emergency department	Code stroke patients in a multi-state region in the south-east US	A retrospective study with existing data on suspected stroke patients presenting to a community hospital between 2018 and 2020 in a	The use of the VAN tool performed with comparable sensitivity and specificity to other stroke severity scales and screening tools for rapid	Level 4: Retrospective study design	The data was collected from only one stroke center	Yes: The information is valuable and can be used to include in data to validate the use of the VAN tool.

| Article Title, Author, etc.	Study Purpose	Sample	Methods	Study Results	Level of Evidence	Study Limitations	Would Use as Evidence to Support a Change?
single large EMS system. *Journal of NeuroInterventional Surgery*, *14*(4), 341–345. https://doi.org/10.1136/neurintsurg-2020-017217			metropolitan geographic area.	detection of stroke			
Sterner, A., Ramstrand, N., Nyström, M., Hagiwara, M. A., & Palmér, L. (2018). Novice nurses' perceptions of acute situations – a phenomenographic study. *International Emergency Nursing*, 40, 23–28. https://doi.org/10.1016/j.ienj.2017.12.001	To describe novice nurses' perceptions of acute situations.	The study included 12 novice nurses.	The study was a qualitative descriptive design study with a phenomenographic approach. Semi-structured interviews were conducted with 12 novice nurses with less than a year of working experience about their perceptions of acute nursing situations.	In an acute situation, the novice nurses interviewed confirm that care is improved when the nurses receive support from experienced colleagues.	Level 5: Qualitative descriptive design study	The study group was tiny, and there was no intervention. The study was only the nurse's perception of how prepared they felt they were in acute situations.	Yes: This study could be the foundation for a larger study that could be conducted. With open minds and the willingness of supervision improvement of novice nurse training and support could be improved.
Teleb, M. S., Ver Hage, A., Carter, J., Jayaraman, M. V.,	To evaluate the VAN screening tool on patients	The nurses at an emergency room and the	The nurses at an emergency room were	The VAN screening tool accurately	Level 3: Controlled trial	A weakness of the study is that it was	Yes: This study showed that

Article Title, Author, etc.	Study Purpose	Sample	Methods	Study Results	Level of Evidence	Study Limitations	Would Use as Evidence to Support a Change?
McTaggart, R. A. (2016). Stroke vision, aphasia, neglect (VAN) assessment—A novel emergent large vessel occlusion screening tool: Pilot study and comparison with current clinical severity indices. *Journal of NeuroInterventional Surgery, 9*(2), 122–126. https://doi.org/10.1136/neurintsurg-2015-012131	arriving at an emergency room.	patients who presented with stroke symptoms, particularly with symptoms of an emergent large vessel occlusion (ELVO).	instructed on the VAN screening tool, which was then utilized on patients who presented to the emergency room with stroke symptoms. This tool was utilized to predict an ELVO screen prior to physician evaluation.	identified ELVO patients and performed more effectively than other stroke screening tools.		a single center study and only 62 stroke evaluations were evaluated for ELVO.	the VAN screening tool is effective at predicting an ELVO. The study showed that the tool can be easily completed by nursing staff and can help to decrease mortality.
Van Gaal, S. C., Kamal, N., & Betzner, M. J. (2017) Approaches to the field recognition of potential thrombectomy candidates. *International Journal of Stroke*, *12*(7), 698–707. https://doi.org/10.1177/1747493017724585	To review the early clinical tests for ischemic stroke	Six randomized controlled trials were examined	Review of the literature evaluating clinical tests for field identification of LVO	VAN tool was found to be an effective tool for the identification of LVO needing intervention	Level 5: Systematic review	No intervention, only study review.	Yes: There was a thorough review and evidence to support the use of the VAN tool.
Ver Hage, A., Teleb, M., & Smith, E. (2018). An emergent large vessel	A quality improvement initiative to	Chart review of 76 patients admitted to a	Chart review of patients on whom the	The door-to-evaluation time was decreased	Level 5: Retrospecti	No intervention,	Yes: The information gathered

Article Title, Author, etc.	Study Purpose	Sample	Methods	Study Results	Level of Evidence	Study Limitations	Would Use as Evidence to Support a Change?
occlusion screening protocol for acute stroke: A quality improvement initiative. *The Journal of Neuroscience Nursing, 50*(2), 68–73. https://doi.org/10.1097/JNN.0000000000000346	determine the efficacy of using an LVO screening in the emergency department by nursing staff to improve the identification of patients.	large urban stroke center.	VAN tool was used and if the tool improved the identification of stroke symptoms more quickly.	by using the VAN tool.	ve chart review	only chart review	was significant and can be used for further research.
Yew, K. S., & Cheng, E. M. (2015). Diagnosis of acute stroke. *American Family Physician*, *91*(8), 528–536.	The article provided thorough information about the pathophysiology of stroke.	No sample	No method, only information provided.	No actual study, only expert opinion.	Level 7: Expert opinion	No study	No: There was only professional opinion and information provided.
Wang, Y., Li, Z., Zhao, X., Wang, C., Wang, X., Wang, D., Liang, L., Liu, L., Wang, C., Li, H., Shen, H., Bettger, J., Pan, Y., Jiang, Y., Yang, X., Zhang, C., Han, X., Meng, X., Yang, X., & Kang, H. (2018). Effect of a multifaceted quality improvement intervention on hospital personnel adherence to performance measures in patients with acute	To determine whether a multifaceted quality improvement intervention can improve hospital personnel adherence to evidence-based performance measure in patients with acute ischemic stroke.	A multicenter study to include 40 public hospitals that enrolled 4800 patients hospitalized with acute ischemic stroke from August of 2014 to June of 2015.	This was an open-label, cluster-randomized clinical trial. Twenty hospitals received a multifaceted quality improvement intervention including a clinical pathway, care	Patients in the intervention group were more likely to receive performance measure than those in the control group and it resulted in a statistically significant improvement in hospital personnel	Level 2: Randomized controlled trial	Limitations of this study include that the hospitals were multifaceted and the motivation from the multiple facilities involved varied. There were several	Yes: Quality improvement measures are always a factor that can evaluated and improved. It is vital to evaluate the competence of these programs.

Article Title, Author, etc.	Study Purpose	Sample	Methods	Study Results	Level of Evidence	Study Limitations	Would Use as Evidence to Support a Change?
ischemic stroke in China: A randomized clinical trial. *JAMA, 320*(3), 245–254. https://doi.org/10.1001/jama.2018.8802			protocols, quality coordinator oversight, and performance measure monitoring and feedback (intervention group). Twenty hospitals participated in the stroke registry with usual care (control group).	adherence to evidence-based performance measure in patients with acute ischemic stroke when assessed.		different characteristics of the hospitals and when a large group such as this is studied the quality improvement interventions could differ.	

Appendix B

Collaborative Institutional Training Initiative Training Certificate
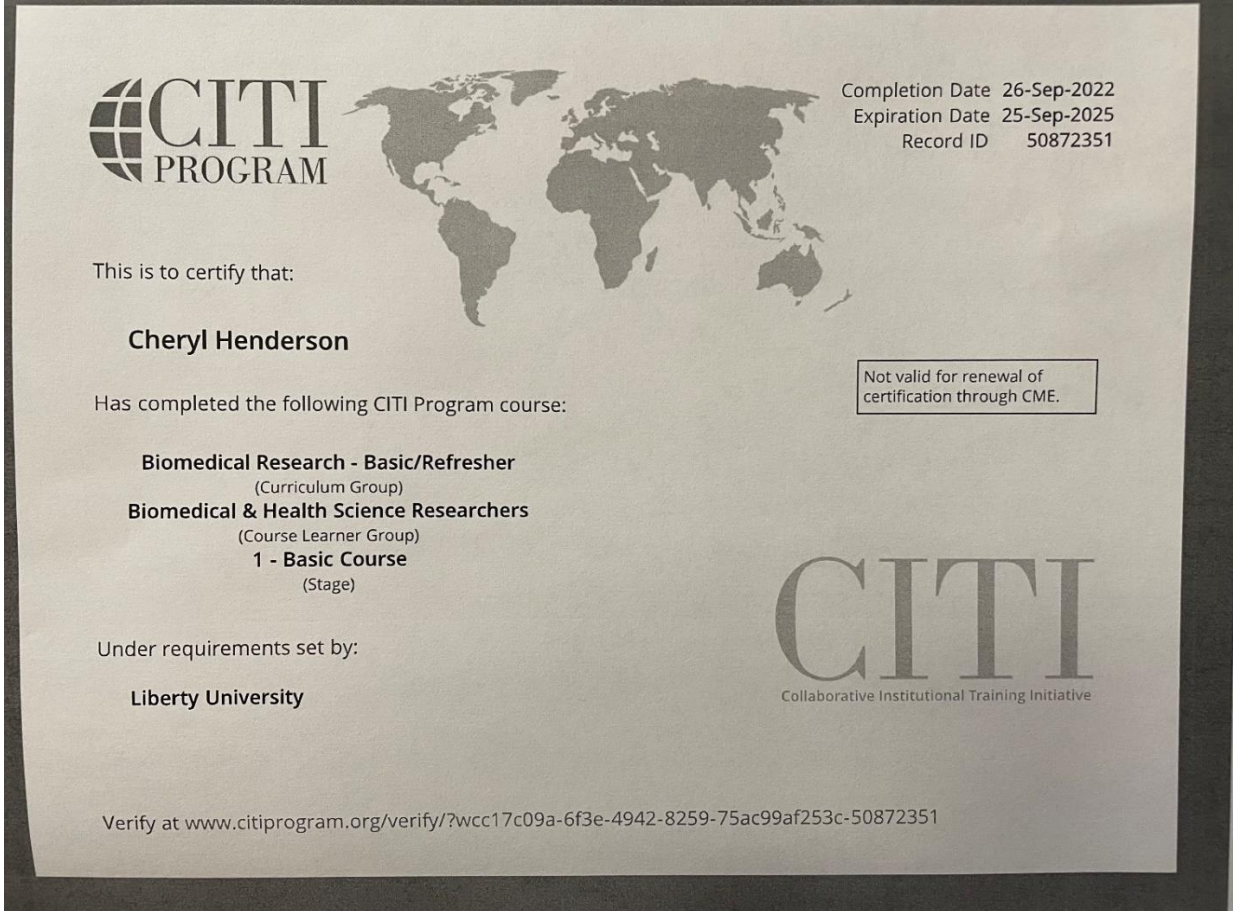
Appendix C

Approval Letter to use Iowa Model

Permission to Use The Iowa Model Revised: Evidence-Based Practice to Promote Excellence in Health Care

Kimberly Jordan - University of Iowa Hospitals and Clinics <survey-bounce@survey.uiowa.edu>

Thu 8/25/2022 1:24 PM

To: Henderson, Cheryl Ann <chenderson76@liberty.edu>

You have permission, as requested today, to review and/or reproduce *The Iowa Model Revised: Evidence-Based Practice to Promote Excellence in Health Care.* Click the link below to open.

The Iowa Model Revised (2015)

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Reference: Iowa Model Collaborative. (2017). Iowa model of evidence-based practice: Revisions and validation. *Worldviews on Evidence-Based Nursing, 14(3), 175-182. doi:10.1111/wvn.12223*

In written material, please add the following statement:
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Please contact UIHCNursingResearchandEBP@uiowa.edu or 319-384-9098 with questions.

Appendix D

Questionnaires

Pre-implementation Questionnaire and Demographics

Section I: Personal Information

1. In what age group are you?

- ○ 19 and under
- ○ 20 - 29
- ○ 30 - 39
- ○ 40 - 49
- ○ 50 - 59
- ○ 60 +

2. Gender:

- ○ Male
- ○ Female

3. Please identify your licensure

- ☐ LPN
- ☐ RN

4. How long have you been an LPN or an RN?

- ☐ Less than one year

- ☐ 1 – 5 years

- ☐ Greater than 5 years

Identify Acute Stroke Symptoms

Please answer with what you think your level of knowledge and understanding is when identifying symptoms of acute stroke:

> 5 = Very Confident
> 4 = Slightly Confident
> 3 = Neutral
> 2 = Unconfident
> 1 = Unsure if I could Identify

New Onset Stroke Symptoms	○ 1	○ 2	○ 3	○ 4	○ 5
Large Vessel Stroke Symptoms	○ 1	○ 2	○ 3	○ 4	○ 5
Use of Vision, Aphasia, Neglect (VAN) tool	○ 1	○ 2	○ 3	○ 4	○ 5
When to Activate Code Stroke?	○ 1	○ 2	○ 3	○ 4	○ 5
Acute Stroke Symptom Mimics	○ 1	○ 2	○ 3	○ 4	○ 5

New Onset Acute Stroke Symptoms/VAN tool

Please circle one answer:

1. Cerebral arteries are like other arteries in the body:
   a. Yes
   b. No

2. When a thrombus occludes blood flow in a large cerebral vessel it can cause severe, permanent functional damage:
   a. Yes
   b. No

3. Can interventions such as thrombectomy change the outcome of acute stroke with large vessel occlusion (LVO)?
   a. Yes
   b. No

4. Do you know what a thrombectomy of a large cerebral vessel is?
   a. Yes
   b. No

5. Do you know what the vision, aphasia, neglect (VAN) tool is?
   a. Yes
   b. No

6. If there is arm drift when performing the VAN test, you stop the exam:
   a. Yes
   b. No

7. If the patient reports new onset double vision, is that a negative VAN score?
    a. Yes
    b. No

8. The patient cannot identify two common items, the VAN score if positive:
    a. Yes
    b. No

9. When you assess the eyes, the patient looks toward the right or left instead of focusing on you, this is a negative VAN score:
    a. Yes
    b. No

10. Do you immediately inform the provider when you the patient has a positive VAN score:
    a. Yes
    b. No

Post Education Survey

Please circle one answer:

1. Cerebral arteries are like other arteries in the body:
   a. Yes
   b. No

2. When a thrombus occludes blood flow in a large cerebral vessel, it can cause severe, permanent functional damage
   a. Yes
   b. No

3. Can interventions such as thrombectomy change the outcome of acute stroke with large vessel occlusion (LVO)?
   a. Yes
   b. No

4. Do you know what a thrombectomy of a large cerebral vessel is?
   a. Yes
   b. No

5. Do you understand the vision, aphasia, and neglect (VAN) tool?
   a. Yes
   b. No

6. If there is arm drift when performing the VAN test, you stop the exam:
   a. Yes
   b. No

7. If the patient reports new onset double vision, is that a negative VAN score?
   a. Yes
   b. No

8. The patient cannot identify two common items, the VAN score if positive:
   a. Yes
   b. No

9. When you assess the eyes, the patient looks toward the right or left instead of focusing on you, this is a negative VAN score:
   a. Yes
   b. No

10. Do you immediately inform the provider when you the patient has a positive VAN score:
    a. Yes
    b. No

3-month Post Education Survey

Please circle one answer:

1. Cerebral arteries are like other arteries in the body:
   a. Yes
   b. No

2. When a thrombus occludes blood flow in a large cerebral vessel it can cause severe, permanent functional damage:
   a. Yes
   b. No

3. Can interventions such as thrombectomy change the outcome of acute stroke with large vessel occlusion (LVO)?
   a. Yes
   b. No

4. Do you know what a thrombectomy of a large cerebral vessel is?
   a. Yes
   b. No

5. Do you know what the vision, aphasia, neglect (VAN) tool is?
   a. Yes
   b. No

6. If there is arm drift when performing the VAN test, you stop the exam:
   a. Yes
   b. No

7. If the patient reports new onset double vision, is that a negative VAN score?
   a. Yes
   b. No

8. The patient cannot identify two common items, the VAN score if positive:
   a. Yes
   b. No

9. When you assess the eyes, the patient looks toward the right or left instead of focusing on you, this is a negative VAN score:
   a. Yes
   b. No

10. Do you immediately inform the provider when you the patient has a positive VAN score:
    a. Yes
    b. No

Please answer the following questions regarding your personal experience after the VAN education and tool

1. Since participating in the educational program about the VAN tool, I understand the signs and symptoms of new acute stroke symptoms.

   If yes, explain why/If no, explain why

2. Have you had the opportunity to use the VAN tool with any of your patients? If so, how many times, and what was your experience?

3. I feel confident I could remain calm in my skill level when faced with a patient experiencing new onset acute stroke symptoms, why?

4. Do you feel that the educational program helped you identify a patient who may be experiencing an acute stroke?

   If yes, explain why/If no, explain why?

5. Are there any experiences you have had as a result of the educational program you would like to share?

Appendix E

Organizational Letter of Support

Letter of Organizational Support

October 13, 2022

Attention: IRB

Liberty University Lynchburg, Virginia

IRB Members:

Cheryl Henderson, MSN, APRN, ENP-C, FNP-C, Liberty University Doctor of Nursing Practice Student (Principal Investigator), and Dr. Vickie Moore, DNP, FNP-C, Assistant Professor of Nursing, and DNP Scholarly Project Chair have proposed to conduct Cheryl Henderson's Doctor of Nursing Practice Scholarly Project: Does the implementation of an educational module and recognition tool for new onset acute stroke symptoms in hospitalized patients increase knowledge and therefore increase stoke screening awareness in nursing staff?

Bon Secours is committed to providing excellent, comprehensive care for our patients, facilitated by the pursuit of quality improvement. Cheryl Henderson's Doctor of Nursing Practice Scholarly Project reflects our commitment that every patient receives optimal quality health care.

Bon Secours is pleased to support Cheryl Henderson's Scholarly project: Does the implementation of an educational module and recognition tool for new onset acute stroke symptoms in hospitalized patients increase knowledge and therefore increase stroke screening awareness in nursing staff?

Feel free to contact me if I can be of further assistance.

(757) 376-8039

Kim_warren@bshi.org

kimberly Warren

Respectfully,

Dr. Kim Warren

Chief Nursing Officer

Bon Secours Southhampton Medical Center